

Interviewee: AWS_01

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Interviewer: Paula Goodale

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- 1 Q: Right, so we talked a bit last time about your background with the weather station--,
- 2 A: Yes.
- 3 Q: And you know, your enthusiasm for the weather in general. Can you just give me a very brief
4 summary of how you became interested in the weather, and when you started collecting
5 observations? That will be the starting point.
- 6 A: Well I've always been interested, I systematically started collected observations in 1993 I
7 suppose. Although partly my parents did as well because it was at their home at the time and
8 I wasn't always there, I was at university sometimes, for example, or not always living at
9 home. But from a--,
- 10 Q: And was that using a weather station or was that just?
- 11 A: Yes, yeah when I had a first formal, I mean it was home built because obviously, it was cheap
12 to do it that way. But I have measured temperature on and off for a lot longer periods, so
13 since I was aged about seven or so because my parents just had a simple thermometer, again
14 that I used, and barometer. So I mean I have been very interested since that age, 1981, since
15 I was aged seven. I actually drew my first temperature graph then of how the temperatures
16 varied from day to day. And just interested in daily weather fluctuations, for example.
- 17 Q: Did you continue with that over a period of time?
- 18 A: Yes, yeah, I mean as I say--,
- 19 Q: In terms of you know, actually recording the data?
- 20 A: Yes, I mean I haven't got a continuous record since I was seven.
- 21 Q: No.
- 22 A: But it was sort of on and off really, and of course I was reading a lot about the weather from an
23 early age as well, because my dad he had a few books on meteorology. Just basic books that
24 I was able to get some idea about the subject, and then that made me more inquisitive to learn
25 further when I was a bit older. So reading the weather magazine when I was a bit older, for

26 example, and carrying on from there. And then studying the subject a little bit in school helped
27 as well. I had some good geography teachers.

28 Q: Yeah. Okay. So how did the weather station come about? Who's idea was that initially?

29 A: Well I mean lots of people have weather stations, it's just a natural thing that if you're
30 interested in something you want to get practically involved, and it's a practical way of getting
31 involved in meteorology and actually measuring the temperature, or measuring how much rain
32 fall. So it makes you understand, it forces you to look at the, erm, to observe what's
33 happening outside a bit more. And that in turn makes you wonder about the processes and
34 makes you want to read more. So one thing leads to another really. But I mean it's a very,
35 you know, I like to do things as well as just read about them. So it's really from the practical
36 thing really, inclination to really want to immerse yourself in the subject and try and understand
37 more about how things work.

38 Q: Yeah, so your first station was at home with your parents?

39 A: Yes, yeah.

40 Q: When did you first get your own kind of, you know, independent weather station ?

41 A: Well I mean I brought one erm, that was actually based at my parents house for a while, and
42 then when I brought my own house, and the first one wasn't really suitable for a weather
43 station at all. So the other one just stayed in mothballs really in my parents home. And then
44 when I moved to Sheffield in 2003 I set up that sort of first serious weather station I think a
45 couple of years after we moved, because we were so busy when we first moved, busy in a
46 new job here and everything. So in 2005 from Sheffield, and then I've moved again recently,
47 but actually that weather station the one I set up in 2005 that got struck by lightning in 2009.

48 Q: Oh dear.

49 A: So the electronics got burnt out and several hundred pounds worth of damage, so it got
50 written off really. And then I had to buy another station after that so I upgraded and got a
51 slightly more modern version, which these days it's on the Internet. So you can actually go to
52 the web page and you can actually have a look in near real time. That's the weather
53 conditions at home there. [shows web page on computer screen] So you can see it's 18
54 degrees at the moment.

55 Q: Yeah.

56 A: So I think it's for the time minus one hour because it's been run on Greenwich Mean Time. So
57 it's giving you things like the temperature, inside and outside, the barometer, air pressure,
58 wind speed, wind direction, solar radiation, ultraviolet radiation, and so on, as well as archiving
59 those things so that you build up a record of the weather conditions.

60 Q: Sure. Okay, so I want to ask you about the equipment that you use, the hardware, the
61 software.

62 A: Yes, yeah.

63 Q: Can you tell me kind of what your current set up is?

64 A: Well, it's a quite a widely used type of weather station, it's called a Davis, which is a US
65 company, that I think about a quarter or a third of the weather stations that are active in the
66 UK use one of these systems or something similar. But basically it's connected up with the
67 Internet, with the software, with the modem, so it's uploading data from the weather station
68 every five minutes onto the erm-- there's a data storage online that I download every week or
69 every couple of weeks. And then you've got five minutes records of things like temperature,
70 wind, rainfall, air pressure, humidity, and so on, solar radiation. And I mean the actual
71 hardware, again it's fairly standard instrumentation, so it's electrical resistance thermometers,
72 thermistors I think. And then it's got a rain gauge on the station outside, and then there's a, let
73 me just see if I've got erm--- [checks web page] I know if this is only rec--, but I've got
74 anemometer on the house roof, which is basically a wind vane recorder thing. So that's a
75 picture of it there on the metal pole.

76 Q: Oh very good, yeah.

77 A: Which someone had to put up because it's too high for me climb up there [laughter]. But that's
78 about 12 metres above ground level. So that's measuring wind speed.

79 Q: So that's a good height above the chimney pot there.

80 A: Wind speed and direction. There's also a solar radiation sensor as well, which is measuring
81 basically how intense the sunlight is. And there's an ultraviolet sensor as well. So those ones
82 are up on the house roof because they need as clear a view as possible of the sky to get
83 accurate readings, particularly the wind. But the other ones are in the back garden, the rain
84 gauge and the temperatures.

85 Q: In a standard sort of Stevenson Screen set up?

86 A: Yes. Yes, well it's a miniature type plastic modern version. They don't really use--, I mean
87 that's a Stevenson Screen [indicates the one by the side of his desk] --- they don't really use
88 them anymore.

89 Q: Yes, I've seen one of those, yeah the big metal ones.

90 A: They have much more miniature modernised versions, plastic so you don't have to keep
91 repainting them. They're maintenance free.

92 Q: Oh right, that's handy.

93 A: And it's also aspirated, which means it's got a small solar powered fan, which actually makes it
94 more accurate because it's actually ventilating the thermometer, so it's keeping it at the same
95 temperature as the outside air temperature, which is how it should be really, which is actually
96 better than one of the Stevenson Screens, anyway. But again, it's sort of a fairly standard
97 modern way of actually doing things. And the barometer's on the part of the weather station

98 indoors. It's a miniature sensor I'm not that--, I can't quite remember the exact details of that,
99 but erm, and it's fairly standard station--,

100 Q: And that's recording pressure and--,

101 A: Yes, yeah air pressure.

102 Q: And so all of that is automated, is that correct?

103 A: Erm, yes, yes it is--,

104 Q: That provides automatic readings?

105 A: Yes it is. It does, yes, so the website updates in near real time basically. Erm, so erm--,

106 Q: Is there anything that you record manually at the moment?

107 A: Not at the moment, I mean I should do, but I've only just set up the station. And that's rainfall
108 because the automatic rain gauges are not always very reliable. So I have got a manual rain
109 gauge that I've put in, and when I start--- because I haven't started taking readings
110 systematically yet because I've only set up the station in the last few weeks. So I'll try and do
111 that from next month, or the autumn. And then basically what I'll need to do is to actually
112 measure the rainfall once a day. But the problem is I'm not always at home, so-- but then you
113 know, so it's slightly complicated to get a continuous record. But yeah, the other thing I do is
114 the weather gets uploaded onto some other websites. At the moment it's just Weather
115 Underground, which is a fairly widely used website for you know, people looking at weather
116 forecasts and--,

117 Q: Why did you choose that one in particular?

118 A: It's a very widely used one, and they actually use weather station data to help them to produce
119 their forecast. So if you're checking what the forecast is then they will feed the station in with
120 hundreds and thousands of other stations to actually help them refine the data to produce that.
121 So it's a new system they've got. But I think the Met Office also do web uploads with a new
122 system, which I need to get on to. But again, I've only just set up the station quite recently.

123 Q: Yeah, yeah. I'm actually talking to a guy about that later on in the week.

124 A: Yes, yeah.

125 Q: It's the WOW weather observations.

126 A: That's right yes, yeah.

127 Q: So we'll find out a bit more about it.

128 A: Yes.

129 Q: [Laughs]. And so it's mainly Weather Underground. Do you maintain any kind of, you know,
130 private records for your own use?

131 A: Yes, I mean I'm part of the Climatological Observers Link, so the idea is I'm going to be
132 submitting the monthly reports from my station based on erm--- basically there's downloadable
133 files. I can't show you here because I've not got the software, because it's here on this
134 computer--,

135 Q: That's fine.

136 A: Because this is a new computer. But basically I get an Excel type spreadsheet of five minutes
137 of data for each month. Then I can calculate monthly what the highest and lowest temperature
138 was during the month, average temperatures, total rainfall. You know, the prevailing wind
139 direction, that sort of thing. And then it gets summarised in a one page that gets sent to this
140 national organisation. There's a couple of hundred stations at least in this. It's mainly keen
141 amateurs actually, but a few professional stations as well. And basically they produce a
142 monthly bulletin. I've actually got some examples over there, so I mean I can--, I mean it's all-
143 --- these are actually online, but this is just the sample of one of their bulletins that they
144 produce. [takes a copy of COL bulletin off the shelf]

145 Q: Yeah, okay.

146 A: And--,

147 Q: And does this get--, who does this get distributed to? Is it to the members?

148 A: It's to the members, that's right. I mean I think they go in libraries-- some libraries as well, but
149 mainly it is the members. But they would go into, you know, they've got quite a good
150 summary of the meteorological data that would erm--, [shows data pages in the COL bulletin]

151 Q: Yeah, so you've got your erm--,

152 A: I'm not sure if I'm in that one actually.

153 Q: Numerical data, but also some descriptions there as well.

154 A: Yes, yeah, yeah. Descriptions from certain stations that's right, and numerical data as well,
155 that's right.

156 Q: Right, yeah, yeah.

157 A: So generally the quality is pretty high, and the reports do get referred to by, you know, by
158 meteorologists sometimes. They're supplementing what the Met Office do, but we're mainly
159 keen amateurs actually. So it's a good way to get a better coverage of national weather data
160 really.

161 Q: Yeah, so how did you become involved in that? Did you ask to join? Did they invite you?

162 A: Yes, well I mean the-- well anyone can join if you, you know. It's just interest really, and I think
163 it's £10 to get the e-bulletins. I've got that one because my dad saw someone and he was
164 getting the hard copy because he's retired, rather than the e-bulletins. And he wasn't so much
165 involved in the online thing so he was getting the hard copies. But it's not, you know-- for £10
166 you can subscribe with an annual subscription and get the e-bulletin version. And it's just a

167 matter of interest really, and contributing data if that's what you want to do. So I mean anyone
168 can be involved.

169 Q: So what do you get out of it? What were your motivations for joining that group?

170 A: Well because-- rather than just recording data and you know, the data not being useful for
171 anything, it can be-- in a small way it can help build up a picture of weather conditions across
172 the UK, and how they vary. Get some historically archived data that it can be potentially used
173 in research or even for teaching purposes on occasion. So I mean it's just the wider value of
174 what you're doing really, rather than just being isolated and actually, you know there's a sort of
175 a social benefit or a wider scientific benefit of collecting the data really.

176 Q: Okay. And the data--, so the data that you collect so it goes to Weather Underground, it goes
177 to Climatological Observers Link. Do you do anything with it yourself? Do you kind of use it
178 for personal or professional projects at all?

179 A: Well, I mean I have done on occasion when I was living in Sheffield. Because I've moved
180 quite a long way outside I'm not sure if it would be quite so relevant to student projects in
181 Sheffield now. But I mean I'm obviously, really interested in climate change from the research
182 I do. So if I stay in this particular site for you know, say some years I'd be interested in looking
183 at how the erm-- if there's any long term drift in it getting say warmer, or wetter, or drier, or
184 whatever. Or more extreme events, or less extreme events, or more snow, or whatever. So I
185 guess, you know, the first thing you need to be able to know if that's happening is accurate
186 data records. So I've no idea how long I'm going to stay living there, but it might be for some
187 years. So that might be a good way of actually getting erm-- being able to define the actual
188 climate change of that place where you're living.

189 And climate change is very relevant at a local scale. So when people talk about climate
190 change and forecast predictions from climate models, one of the key limitations is the models
191 are producing predictions that are quite a low spatial resolution. So they've got grid box sizes,
192 you might only have a few grid cells covering the small country. But this is sort of making the
193 connection between climate change predictions, which are quite big, sort of scale, but it's not
194 really got any local resolution. This is actually very local, what you're actually measuring, so
195 it's directly relevant for people's everyday lives, what the weather's doing in your back garden.
196 You can actually, I mean if you have a long enough record of this, you can actually
197 demonstrate the local effects of climate change that are acting on these scales, that are
198 directly relevant for people's day to day lives, and that's the interesting thing about it I think.
199 Because local sites, they have unique, obviously, weather conditions. Like I live on the edge
200 of a lake, so that's going to have some effect on the wider effects of climate change on
201 affecting the local meteorology of that place because the lake might modify that in some way.
202 So I'm particularly interested in the long term, in looking into that if I stay there sufficiently
203 long. It's a sort of personal research interest really, I suppose, but also connecting this sort of
204 very small, you know, local scale measurement with wider scale climate change I think is
205 really interesting.

206 Q: Okay. So are there any particular challenges in collecting the data? What can go wrong with
207 it?

208 A: Well obviously, you need to have some familiarity with the equipment to set it up in the first
209 place. It helps obviously, that I had the equipment set up in my previous home. It's always
210 easier setting up something the second time because you're more familiar with it. So I mean
211 there are a certain amount of cabling involved because although it's a wireless weather
212 station, I didn't go wireless for all the sensors, because it would have been you know, an
213 expensive enough system as it was, it would have been even more expensive. So I had to
214 route some cables from the wind vane and anemometer, and you know, the solar and UV
215 sensors down the chimney, down to the ground, and bury them in the back garden, along a
216 wall and so on. But I've done that sort of thing before in Sheffield, so it was a couple of days
217 to sort it out really here, but I knew what I was doing more or less. Of course the main
218 challenge is actually mounting the equipment, part of it at a high enough height to record the
219 wind. And because I wasn't really going to go up on top of the roof myself, because I'm not
220 particularly confident about doing that, I called some people who set up the weather station in
221 Sheffield who deal-- they're steeplejacks basically. So they'd go up the Arts Tower if they had
222 to. So for them it was easy to go up the top of a ten metre chimney and just, you know, they
223 had a very tall ladder in sections that I wouldn't have dreamed of going up.

224 Q: No [laughs].

225 A: But they were just you know, straddling on top of the roof, you know.

226 Q: Goodness, yeah.

227 A: [Laughs]. You know for them that was just an easy job, you know, and they had it up, they
228 had it all installed, metal pole and brackets, and everything in a couple of hours so. And they
229 put a lightening conductor on because obviously, I've been struck by lightning once before on
230 my house, and once you've been struck by lightning you tend to be a bit more careful about
231 putting tall metal poles on top of your house after that.

232 Q: Sure. So you need a bit of technical and practical know how.

233 A: Yes, yeah.

234 Q: In order to get started. You mentioned the lightning-- are there any other kind of challenges
235 day-to-day that occur you know, in terms of--?

236 A: Yeah, so I mean you have to be well, you're meant to really calibrate your sensors every now
237 and then because even though it's automatic it's all very easy to leave it just running and
238 assume that the data you're getting are entirely accurate. But of course the data you're
239 collecting are only as good as the instruments that are recording them, which can sort of
240 malfunction, or they can show some slow drift in time that might not easily be detectable. In
241 other words they might not be recording entirely accurate data, or they could stop recording if
242 there's some glitch or something. So you need to keep an eye on the data, I'd say on a

243 weekly basis. So that's why the website's useful to keep checking. Occasionally the Internet
244 connection gets lost and then you find it's not archiving the data. But what happens is there's
245 a back up on the weather station, so actually, usually it still is-- and then you just have to
246 unplug and plug it in a certain way, and take the batteries out and put it all back in. It's a bit of
247 a pain, but it's something that you just have to do occasionally. But it's a pretty good system.
248 I know that erm-- because when I was getting this in 2009 I got advice from you know, people
249 who had been using systems, like British Antarctic Survey, and it's exactly the same system
250 they use on their runways in Antarctica in the summer. Not in the winter. But in the summer for
251 operational sort of airfield use. And someone I know who's a senior meteorologist, well he's
252 retired now, at the British Antarctic Survey, he strongly recommended one of these systems.
253 And I got some other independent views as well, and some reports.

254 So it's a very good system for the price. So you know, it's a lot cheaper than the standard Met
255 Office professional station. It's still not cheap by, you know-- I mean it's over £1000, but it's not
256 say three, four, 5000, which a full Met Office weather station would be. And they're not--,
257 obviously you're limited by the site, so I mean there's no point in spending that amount of
258 money anyway for most people, including myself, because we don't have the proper-- we
259 don't have a big field to put the equipment in. So you're always going to be limited to a certain
260 extent by the fact that you, you know, if you have Met equipment you're meant to put it in a
261 particular, site it in an open location well away from trees and buildings, and of course most
262 people don't have that sort of site.

263 Ideally where I am I should really just put a platform in the middle of the lake. It's not my lake,
264 but that's what I'd do, and have the equipment there. But then it would be doing all this sort of
265 thing when it's windy so--.

266 Q: Yeah. Yeah, kind of almost er--,

267 A: I think as long as you're aware of local limitations then you can still make good use of the
268 data. So I mean for example, the temperature data are reasonable I think, --going to be
269 reasonable from this site. But you know, it's still not quite the same as a Met Office having an
270 open field site, so there could be some biases in the temperature because of a map for
271 example. So you know, it's sort of erm-- there are limitations obviously, but with the
272 equipment you just need to check it really, and understand it really. And you know, things you
273 can do like compare the data that you've recently recorded, occasionally with say the nearest
274 Met Office stations. Particularly useful for things like air pressure. And then you can just
275 check that you know, what you're recording is in keeping with those official stations to make
276 sure the instruments are still churning out sensible values really.

277 Q: So you do quite a bit of checking to make sure there's accuracy and can--,

278 A: I don't do as much as I would like to, but I have done. I mean I check the barometer every
279 now and then, at least once a month. And the thermometer I haven't checked for a while, but I
280 actually need to really get hold of a calibration thermometer and, you know it's pre-calibrated,

281 but that's when I bought it in 2009 and that should really be done once a year. But you know, I
282 need to get hold of some erm-- there's a national standard thermometer and then erm-- or
283 borrow one, or get hold of one, and then actually just recalibrate really. But yeah, you're
284 meant to erm— ideally, in an ideal situation recalibrate these instruments every so often,
285 every couple of years I'd say.

286 Q: Hmm-hmm. Okay. So I want to talk a little bit about sharing the data.

287 A: Yes, yeah.

288 Q: So you're sharing it through Wunderground and through COL.

289 A: Yeah.

290 Q: How do you feel about them then using that data? So you said Wunderground are using it as
291 part of their, you know, their weather forecasting, etcetera.

292 A: Yes, yeah.

293 Q: Do you have any thoughts on how they might then supply that data to other people, kind of
294 either on an open basis or on a paid for basis?

295 A: I mean it's all open with Wunderground.

296 Q: Is it? Oh okay.

297 A: At least the--, I mean because this is just the website, which anybody can access. So I mean it
298 will actually give a forecast, which I believe, I'm not entirely certain, but I think it's based partly
299 on my data. So there's a forecast for next week [shows the web page]. So I'm perfectly
300 happy with that because it's a wider community use of-- you know, I don't think, I mean there's
301 no point in spending a lot of money on equipment for something I'm passionate about and
302 interested in if it's not in some way benefitting other people, well even from an education point
303 of view. Even you know, the data are not professional standard, but the station is a semi
304 professional station so the data can still be used in some research and teaching contexts,
305 from that point of view. So I mean, if it helps Weather Underground with their forecast in a
306 small way -- because there's, obviously, there's lots of other stations, then I'm absolutely fine
307 with that. I think it's great, you know because it's a wider use of the data, so rather than just
308 me using it, or my students using it, then anyone can log onto the site and use it. And I'm, you
309 know, if people are interested then I'm happy because that gets them potentially interested in
310 meteorology doesn't it as well so--.

311 Q: Hmm, absolutely, yeah. Do you download any data from Weather Underground, other
312 people's data? Do you use--?

313 A: No I don't have time to be perfectly honest.

314 Q: No? No, you mainly just make use of your own?

315 A: Yeah, yeah. I mean I am interested in comparing. I mean I've, obviously, only just set up this
316 station on the new site because you can see there's not a--, can you see this is me here, and

317 this is another station that's nearest me [shows information on the Weather Underground web
318 site].

319 Q: Quite nearby.

320 A: Can you see how win--- I think that's temperature, and we're in the green there, I'm quite
321 pleased about. They don't seem to have wind currently at the other station, but the
322 temperature's in agreement.

323 Q: That's something to keep an eye on is it? So I mean, do you contact other people, you know--

324 A: I don't have time.

325 Q: Are you involved in any kind of like groups or--?

326 A: Well, only in the sense that I contribute data to the COL. But I don't have time to get involved
327 in meetings and things anymore. I mean I did when I used to be on my own. When you have
328 a family and stuff it's just, you find you don't, you can't do the same things that you used to do.
329 So erm--,

330 Q: So what sort of things did you used to be involved in? What did you do?

331 A: Well, I used to go to a lot of meetings, also partly because I was in the South East, so it was
332 easy to get to meetings in London. That's another issue with being in Sheffield is it's really
333 hard to, you know, find the time or sometimes rail tickets are really expensive from here to get
334 down to London. It's the time factor as much as anything. You know I do occasionally go to
335 meetings, but I used to regularly go when I was younger. I mean I do go to meetings
336 occasionally though, but I mean it's erm, yeah I mean I'd like to do more, but I guess I'm busy
337 with my job basically. And if I'm-- it's erm, you know, at the moment I'm just spending a lot of
338 effort setting up this station here so--,

339 Q: Sure.

340 A: We only just moved in April. Yeah I mean I--,

341 Q: What do you get out of the meetings when you have been involved in them in the past? Is it
342 just kind of networking, or is it kind of sharing?

343 A: Yeah networking. Networking, sharing, listening to people if they give talks. I mean I used to
344 go to meetings in astronomy, because that's another interest of mine.

345 Q: Oh right.

346 A: But a lot of those were in London. And the main national meteorological meetings-- there is a
347 Leeds centre, which is the closest one, but again Leeds is not Sheffield. It's still a bit of an
348 effort to get to Leeds.

349 Q: It is, yeah.

350 A: I mean I did go, I had to give them a talk and I went then, and I've been to another one of their
351 meetings. I've been to a couple of their meetings in the last year, the Leeds regional centre of

352 the Royal Meteorological Society. But I can't go each month it's just, you know, it's the time
353 factor really.

354 Q: And do you communicate a lot about, you know, do you tell other people like your friends and
355 family about your weather station?

356 A: Yes.

357 Q: Is it a topic of conversation?

358 A: Yeah, sometimes I mean erm--,

359 Q: Yeah? What do they think of it?

360 A: Well, I don't know.

361 Q: You know, is it something that interests them you know, do they come up again?

362 A: Yes well, some of them I mean erm, yeah I mean I, yeah, yeah. But you know, yes I mean
363 there's so much information online isn't there? I mean they, I think people would be
364 understanding if I did something like that if they know me at all, being interested in the weather
365 and meteorology, and it's not an unusual thing to be doing anyway by a long way. There's a lot
366 of people who are on these networks.

367 Q: Yeah. Do you encourage other people to get involved?

368 A: Yeah, yeah. Yes I mean why wouldn't you if you see people being interested? I mean I don't
369 want to force feed anyone, but I mean I've got colleagues in the department who keep
370 weather stations and I've mentioned to them that I'm doing this, and just email them the web
371 links just so that they at least are aware of the possibilities in case they decide to either
372 upgrade their stations or whatever. But I don't like telling people you should do this or that or
373 the other. It's just really making them aware of you know.

374 Q: It's more of an informal thing.

375 A: Yes, yeah. Or informing people rather than suggesting that they should change what they do
376 or you know. But I think erm, I mean it's erm-- I think it's nice as a sort of a, you know,
377 someone who researches on climate change, so it's part of their job. It's nice to be able to do
378 something on an amateur basis. It keeps you in touch with perhaps what ordinary people
379 might be thinking--, people who are not directly researching weather and climate in other
380 words, what they might be thinking rather than just--. Because what you see time and time
381 again is professional research scientists, they get out of touch with perhaps what the general
382 public might be thinking about science. And this sort of activity it helps keep your feet on the
383 ground a bit more than if you're just doing professional research for the university or
384 something. So I mean it's just, I mean it's a nice thing to do, and it's a practical thing, and it's
385 you know, you keep in touch with the amateur-- community of amateur meteorologists. Many
386 of whom are very knowledgeable by the way.

387 Q: Yeah, yeah.

388 A: And they've got, you know, they do do work to a very high standard, it's just that their job isn't
389 in the area. But it doesn't necessarily mean that they don't do a very good job of it, you know,
390 many of them know a lot about meteorology so--.

391 Q: So you know, a lot of people would class this sort of thing as say citizen science--

392 A: Yes, yeah it is in a sense. That's right, yes.

393 Q: And you mentioned astronomy. Are you involved in any other kind of citizen science activities
394 at the moment?

395 A: Not at the moment, I mean I well, except I do give public talks on climate change. I don't know
396 if that counts or not. I just gave one on Friday up in Holmfirth for example, to some climate
397 change action group. But I mean, yeah I mean I've been involved quite heavily in public
398 understanding of astronomy in the past activities through local and national astronomical
399 organisations. But again because a lot of that was based in London and time factor, and I've
400 been incredibly busy with my job here. And you know people-- I've just been incredibly busy
401 so I've had to drop a lot of that. But I still read about astronomy when I have the time.

402 Q: Yeah. But you don't contribute, you know collect data or contribute data in any of those kind
403 of areas?

404 A: No I mean I have done a bit in the past. But I mean it's just, I mean it's just a time factor really.

405 Q: Yeah. So why is it the weather that's kind of held out, out of those sort of activities? What is
406 the attraction of that over all the others?

407 A: Well astronomy's--, well anything can be time consuming, but it's fairly easy to--, well I say
408 fairly easy-- Once you have a sort of basic erm-- a bit of basic knowledge and experience it's
409 fairly easy to set this up and then, it almost doesn't quite run itself, but you know you don't
410 have to spend a huge amount of time on it. Whereas in astronomy you need to find a place
411 where you're away from the streetlights, and I used to do a lot of photography, night sky
412 photography of astronomical subjects, and it's just really time consuming basically. And it's,
413 yeah, I don't always have a lot of energy left in the middle of the night now if I'm up at five in
414 the morning, and I have to work you know. It's not like when I was a student or whatever, and I
415 had somehow more time to get involved in those things. So it's just, I mean, the sort of work
416 I'm involved with it's not a nine to five job, it's you know-- research in itself, it's very time
417 consuming. And you know, quite often I'm working at home or whatever as well, so it's just the
418 time factor really. But I have been involved in astronomy quite heavily in the past.

419 Q: Okay. I just want to ask you then a little bit about a couple of your professional interests. So
420 as a professional climatologist do you have any opinions on crowd sourced data? And you
421 know, it's contribution within the field? Does it have a value or is it something that's of, you
422 know, more of value say to weather forecasters than to climate science?

423 A: No I think it can be useful. The thing is you need to know about the circumstances in which
424 the data were collected, so you can make the best possible use of them. Because the

425 problem can be variable data quality, and you know-- But I guess the idea is if you have a lot
426 of data then you can compare the data against each other to partly get round that problem
427 anyway, and if you know the circumstances in which people collect data. But obviously, it's a
428 way of actually getting more data, and getting people involved as well. So I think they can
429 certainly be useful, it depends exactly on what type of data people are collecting because
430 some are easier than others. But yeah, certainly it's a great idea from many points of view.
431 It's just you need to carefully manage the-- how you do it, and how you use the data that are
432 collected, to make the best use of them.

433 Q: What are the problems that arise with it? Is it accuracy? Is it--,

434 A: Yeah I mean, well--,

435 Q: Anything else?

436 A: It depends how many people, you know, how you get involved, where, so what the coverage
437 is like, as well as just the accuracy really. But yeah, I mean there are of course issues with
438 professionally collected data as well. It's just quite often you're more in control if you collect
439 the data yourself than some crowd-sourced data, The quality can be a bit more variable. But I
440 think you know, there are ways of getting round that and it's obviously, you don't-- you can't
441 collect data, as many data as you would like normally, so it gives you more complete
442 coverage. So it really depends what you're trying to do, but I think it can be very useful in
443 terms of crowd-sourcing.

444 Q: Okay. And do you in your work, do you contribute to or use any of the global temperature
445 datasets? Is that of interest to you? It's just something that we've particularly been looking at
446 during the project.

447 A: Yeah. I mean I don't contribute to global temperature datasets, but I use them in my research.
448 I mean I actually look at temperatures in specific regions, like Greenland for example, or
449 Iceland. So I mean I've helped with-- I've done some analysis quite recently of looking at
450 temperature variations in Greenland and how that's linked with climate change, and factors
451 causing those temperatures to vary. So I've got, you know, collaborations with the Danish
452 Meteorological Institute for example, who run those weather stations in Greenland, or some of
453 the main ones. So yeah I mean I'm fairly actively involved in the sort of regional climate data
454 analysis.

455 Q: So what sort of analysis do you do? Can you explain a little about that, for the layperson?

456 A: Well, how our temperatures are changing over time, what's causing them to vary, and how
457 they're changing differently in different parts of say a country, or the world, or Greenland
458 compared with global temperatures. Different seasons, and different parts of Greenland or
459 whatever. And then factors like changes in air circulation or ocean currents that might cause,
460 you know, those differences in regional compared with global temperatures basically.

461 Q: So you're looking at the specific region compared to the-- which are global?

462 A: Yes I mean I, Yeah I mean I look at a number of areas.

463 Q: Why is that region of particular interest to you?

464 A: Well, really because I've been looking at the mass balance of the ice sheets for more than a
465 decade now. So I'm interested in what's causing that to vary. More ice melting in the summer
466 for example, or more snow falling there in the winter. And how that's linked with global
467 warming because obviously the idea is if Greenland gets warmer then you've got more ice and
468 snow melting, and then a mass of loss from the ice sheet, which is contributing to global sea
469 level rise. And then there's all sorts of interesting questions about what's actually causing
470 that. There's actually been an accelerated warming in Greenland compared with much of the
471 rest of the world in the last say 15/20 years or so, which is quite interesting. So it's interesting
472 to understand more about that actually.

473 Q: And is that contributing to specific projects that are ongoing?

474 A: Yeah, so they are involving a number of international and national projects that are looking at
475 changes in Greenland ice sheet mass balance, for example.

476 Q: Okay. And so you know, what kind of organisations are involved in those?

477 A: Well, there's a wide a variety I mean it's, obviously, a big country, it's a big problem so there's
478 a lot of people who are interested in trying to actually answer some of these key science
479 questions. So I mean I've done work with NASA for example, in the past where they've had
480 their aircraft surveying the edges of the ice sheet, how the mass is changing. And then they
481 want an interpretation on that so I did some climate modelling to help them actually interpret
482 some of their aircraft and satellite data. And we published some results together. And you
483 know, there's various institutes around the world where people are interested in ice sheets
484 and climate change, so I've got a fairly good, you know, I've got quite a few people I work with
485 in different places. We really help each other because it's such a big problem, you know, no
486 one can look at the whole problem. So it's really complementary analysis of datasets, and you
487 know, syntheses of them to get a better understanding of some of the processes that are
488 happening in Greenland.

489 Q: So it's pretty much an international field and a collaboration.

490 A: Yeah I mean climate change is isn't it because it affects everyone. So, I mean one of the key
491 questions is sea level rise, and you know, polar amplification of global warming, which is
492 where some of the most rapidly observed changes have been in the arctic in the last 10 or 15
493 years in terms of warming. So it's really trying to understand those changes better, and
494 actually helping us predict for the future what's going to happen.

495 Q: Yeah. Are there any problems with data in that area?

496 A: There's always problems with data, especially somewhere like Greenland where there's large
497 parts of the country where there's no data. So again, you have to model some of the changes
498 in areas where you don't have weather stations to actually connect it, and use satellites as

499 well. So it's really-- I've been involved in some efforts trying to pull together different
500 datasets. You know, you're just yourself a small piece of the puzzle. But you know, I'm
501 working together with people who use satellites. Other people who, they use climate models,
502 and really it's helping to really put together a complete story from these different individual bits
503 of data.

504 Q: And do you mainly work with academic researchers, or do you get involved with the Met, you
505 know, the national Met Services?

506 A: Both really, I mean I've worked with both the Danish Meteorological Institute, who have a lot of
507 the weather data in Greenland, and also the Icelandic Met Office, who obviously, Iceland
508 weather data. And also the UK Met Office, I have some good collaborations. In fact we just
509 published in a paper at the moment with one of their scientists on recent changes in North
510 Atlantic storminess, and how that's linked with climate change.

511 Q: Right. Okay. Are you involved in the IPCC at all?

512 A: Yeah, I was one of the authors on the fifth assessment report. I'm chapter 13 I think. Well,
513 there's several hundred authors. Chapter 13, sea level change chapter.

514 Q: Right, okay.

515 A: I can't remember the exact title, but you know, there's a lot of people involved so--.

516 Q: Yeah, is that--, do you find that an interesting process, a kind of a--,

517 A: Yeah, I mean I'm really on the edge because I wasn't a lead author, I was just a contributing
518 author out of, you know, a couple of hundred or whatever it was authors. The whole report is a
519 massive report. But you know, it's erm, yeah it's an interesting process. And it's a very
520 valuable resource for people to understand about climate change. I mean its--,

521 Q: As a researcher do you get anything out of contributing to that process?

522 A: I mean it's nice to see you know, it's nice to see your work being used for some sort of bigger
523 purpose really I think, rather than just you know, publishing papers and people just reading
524 them. It's nice that they can actually use the datasets, and actually put them together with
525 some other results from other research. And then it's useful beyond just what you're doing
526 yourself, so I think that's the main thing. And it's really just helping to understand more about
527 climate changing variability again, and how that's likely to change in the future. That's the key
528 thing.

529 Q: So I mean do you get involved in the communication of that or is it erm--,

530 A: Yes I mean well--,

531 Q: The IPCC have been undergoing a massive communication programme over the last few
532 months.

533 A: Yeah. Yeah they have, they seem to have done a better job with this report than a lot of--, I
534 mean only in the sense that I do public outreach talks on climate change--,

535 Q: Right okay.

536 A: Like the one I've given last Friday. I've done three of those I think in the last few months to
537 various organisations. So typically I do a few a year to external organisations just as part of,
538 you know--, it helps me understand better if I go out and talk to public. Because actually, quite
539 often you get some of the most interesting questions from you know, the general public rather
540 than if you're giving a specialist talk in your field.

541 Q: What sort of things do they come up with?

542 A: Well, fundamental things about how the climate system works, or what we should be doing to
543 try and solve the problems at a more fundamental level. So it really forces you to think about
544 the wider implications of what you're doing, and the wider value of what you're doing really. I
545 always find it gives me a bit of a wider purpose to actually do that sort of activity. So I find it,
546 you know, quite rewarding to actually just go out and talk to people because after all, you
547 know, it's the people through the governments who are funding, you know, university
548 scientists and the IPCC.

549 Q: Yeah.

550 A: So you know, we need to justify to the general public what it is we're doing and why, and why
551 we think that's useful. And try and make sure that we get them on board, because we're not
552 in some ivory tower. We've got to go out there and actually get the message out that you
553 know--. There's been some bad press previously about IPCC and climate change, and we've
554 just got to make sure that we get the science across to people, general people, in as
555 transparent a way as possible so that they understand the process, and that we're not trying to
556 cover things up or anything. Or at least, you know, most scientists are genuine, but it's just
557 really trying to get that communication more clearly across that's important.

558 Q: And what do you think is the key to getting that message across? Is it, you know, showing
559 how scary it could be, or is it kind of getting, you know, moving more towards positive action?
560 Are there any particular approaches that you think work well?

561 A: I think just show your enthusiasm really, and try and explain things at a clear, simple, easy to
562 understand level, but don't try and over simplify, so you're saying, you don't want to talk down
563 to people. So if you, you know, present them with your latest research results, but you can
564 dress it up in such a way that you don't overcomplicate it. And then if you get them sufficiently
565 interested then they think, oh yes you know, that's really interesting actually what you're doing,
566 and you know, they'll ask you some questions based on that. So if you're enthusiastic and
567 present things in a clear way then you can get a lot of people you talk to enthusiastic as well,
568 and motivated to better understand things. So I think it's that, you know it's a two way
569 communication process clearly.

570 Q: What do you do when you encounter sceptics?

571 A: I don't tend to encounter them.

572 Q: Don't you?

573 A: That's interesting because obviously, it's fairly selective, when you go to give a talk to an
574 organisation about climate change I find that it's people who are interested who tend to turn up
575 at those talks, and they're generally not sceptics. There might be the odd one or two. I mean
576 I'm perfectly happy to handle questions from sceptics because, as long as they're not personal
577 because, I mean I've never had that problem, no. But if, you know, questions, which are
578 genuinely sceptical, it's always healthy to question what you're doing anyway. So I mean I've
579 had a few such questions, and I mean you just handle them in a way, you just answer the
580 question honestly you know. You don't pretend that science has all the answers. It doesn't,
581 it's evidence based. You never 100 percent prove anything in science, but you have strong
582 evidence in certain areas and you have to go with that evidence. You know, that's how the
583 scientific sort of hypothesis testing method works. So you just, you know, you answer the
584 questions up front. But I think if you answer the questions honestly and properly then if you do
585 have a sceptic in the room, which I've had occasionally, then I think what happens is they can
586 see that everyone else in the room is against them. Not just me if I, you know, because you
587 get the idea if people are against or with you not just the person who's asked you the question
588 when you answer the question. So it's that convincing people in a room, so the sceptic quite
589 often--,

590 Q: Sort of getting the crowd behind you.

591 A: Yes, yeah, yeah, yeah. But you know, it tends to be obviously, climate sceptics you get a few
592 of those, but actually they're very much in the minority now anyway because the evidence for
593 recent climate change in the last 50 to 100 years has been largely influenced by human
594 greenhouse gas emissions, it's so compelling now that it's very hard to say there's not
595 something happening. But on that basis even though there are aspects of it that we still need
596 to understand a lot better than we currently do. So it's really just, you know, if you get things
597 across in clear and simple way, and honest way, then I think you can deal with most of those
598 sceptical questions. Luckily I wasn't, because I'm not directly, you know centrally involved in
599 the IPCC I've not been involved in any of the personal attacks that some of the sort of leading
600 people there have been.

601 Q: Yeah. So just one last thing then, is there anything that would make your professional work
602 easier?

603 A: What do you mean?

604 Q: In terms of, I don't know, access to data, equipment, resources, collaborations, anything that
605 would contribute to, you know, to what you do?

606 A: Well, I mean I think that erm, in general I'm fairly lucky, I would say sometimes it's a question
607 of time, having time to do all the things that you know, you'd like to do because obviously,
608 there's a lot of pressures with my sort of job that obviously, you have research, teaching,
609 administration. And there's a lot of turmoil in the UK higher education system currently, so it's

610 really just having a bit more time to think sometimes, to engender new ideas rather than just
611 feeling that you're, you know, like the proverbial sort of mouse on the cycle wheel or
612 something, or trying to get the next job done and not having time always to sit back and just
613 think about things. So I think sometimes I could benefit from just doing that or having a bit
614 more time. I think that you know, we are quite lucky in a sense in this department we do have
615 a study leave system. I'm going to have a study leave next year, well for several months
616 hopefully. So that should hopefully help with that issue. So we get that every four years, just
617 for a term. But I would say there's no shortage of data, for example. I mean there's no
618 shortage of people to talk to, or meetings to go to if you have time. Time seems to be a big
619 enemy sometimes.

620 Q: Yeah.

621 A: Sometimes it's a funny thing [laughs].

622 Q: And is, you know, is funding easy to access in this particular area?

623 A: Well, it's like anything else, it's pretty competitive, but you know, I actually don't need big funds
624 to do a lot of what I do, although the university like to, obviously, see that so--. Yeah I mean
625 it's an interesting issue, I mean we could have a separate discussion there to say right. I
626 mean I think there's a lot of datasets that are freely available, and I know people, you know
627 internationally that I can collaborate with them without needing a lot of money. And I can do a
628 lot of desk space work, so that's not a huge issue for me actually, currently.

629 Q: And you've got the computing power and everything that you need?

630 A: Yes I mean, I can actually do a lot of my work on a desktop in the end.

631 Q: Yeah, that's good. Okay. Is there anything else that we've not covered that you think would
632 be useful to mention?

633 A: I think we've covered quite a wide area.

634 Q: Yeah we have, yeah.

635 A: But if, you know, do let me know afterwards.

636 Q: Yeah, I mean I might just come back to you with a question or two over email or something.

637 A: Yeah sure that's fine. Yeah, that's fine.

638 Q: Thanks very much for your time.

639 A: No you're welcome.

640 Q: That's been very helpful.

641 [END OF INTERVIEW]